

NOTES ON TUBEROUS *DROSERA* OF WESTERN AUSTRALIA

by Steve Rose

The notes will list *Drosera* species in a similar sequence as appears in Rica Erickson's book *Plants of Prey*. Numbers correspond to book.

19. *D. species* is, according to N. Marchant and myself, really the "hills" form of *D. bulbosa*. It goes deep maroon as it matures. It is found quite wide-spread in loams, gravel and silty sands. Plants grow from 4-10 cm in diameter depending on climatic conditions. Usually the leaves vary very little in shape but leaf color is variable depending upon age, soil and sun concentration. Usually I can count as many as 15 leaves in one particular specimen. The flowers often appear before the rosette and even more so after a bushfire.
20. *D. bulbosa* (sand form). This species is smaller and rarely grows more than six leaves. It always is found deeply colored because of poor soils, and proportionately sparse shrubs and less overhead shade. It grows in several slow drying sand swamps in association with *D. menziesii*, *D. heterophylla*, *D. gigantea* and *U. menziesii*. The tubers are very small and white or pink, rarely deep red. The "hills form" tuber is always dark orange and size varies from a few mm to 2 cm in width. It has characteristic scales whereas the "sand form" does not. The "sand form" tuber is nearly round in shape but the larger sized "hills form" is heart-shaped. (Fig. 1)



SAND FORM      HILL FORM

Fig. 1

- D. bulbosa* (Mount Many Peaks type). This form grows in shallow soils over laterite rock in an area that is very impoverished and poorly drained. The plants are extremely small compared to the other forms. The miniature rosettes rarely exceed 1 cm in diameter. There are usually 1-2 flowers which are nearly as large as the rosette. Only a small percentage of the plants flower but they seem to divide adequately by vegetative means. The plants are deep red in color even in the shade of shrubs which are 10-30 cm tall. There are normally only 3-5 leaves per plant.
21. *D. macrophylla*. This plant is extremely rare because of the destruction of its habitat and grows under Jam trees around York and Northam, about 50-60 miles east of Perth. I feel that no one has this species in cultivation. I have never collected it, and I have misnamed *D. erythrorhiza* "hills form" as *D. macrophylla*. There are many differences and Erickson's descriptions are accurate. This species does not develop red pigment at all.
22. *D. erythrorhiza*. There are two main forms: the sand and hill forms. The sand form is the one drawn in Erickson's book. It has 3-5 leaves and sometimes 6 leaves which are somewhat more blunt than the "hills form". Strangely enough, it never turns a deeper color than the "hills form" and is shorter lived in terms of surface life. It goes dormant weeks before the "hills form" and also tends to flower less but forms dense colonies by simple division. This form grows in association with *D. macrantha*, *D. menziesii* (sand form), *D. pallida* and sometimes *D. paleacea*. It is widespread and common where conditions are favorable. Always found in well drained sand.

The "hills form" is a robust plant that is found in laterite gravel, peaty loam, loam, silty sand and heavy soils. It grows best in deep shade and deep leaf mold. It requires well drained conditions and can be grown in fully to semi-exposed sunlight. Those that are more exposed are naturally redder and longer lived in surface life. The number of leaves are usually 8-10 in number and rarely up to 13 leaves. The tuber size averages about 1.5-3.0 cm in diameter whereas the sand form is much smaller. Both tubers have scales and are deep red in color. The "hills form" flowers more readily without fire but almost all plants of adequate size will flower after a fire, even if the plant completely exhausts itself and dies. This is not uncommon. This form is by far the most luxuriant rosetted *Drosera* in W. A. It grows up to 15 cm (actually more) across and that is big! Perhaps, I have seen some larger ones but the measuring tape was not at hand. The big ones grow in filtered sun (never direct) in 45 inches of rainfall per year, well drained, deep leaf mold and loose laterite gravel which are all perfect conditions.

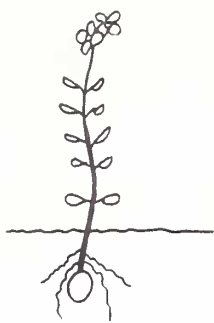


Fig. 2

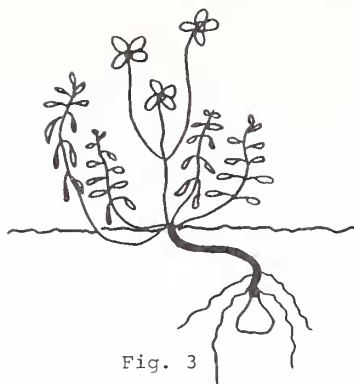


Fig. 3

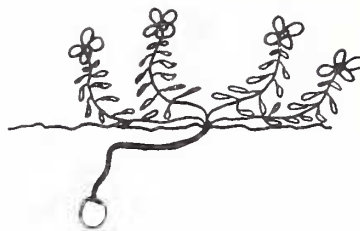


Fig. 4



Fig. 5

23. *D. zonaria*. This is a beautifully colored *Drosera* which grows in a variety of locations but always in deep, well-drained silica sand. It comes up late and is short lived on the surface. It readily divides but usually in 2-3 smaller tubers. I've seen it literally carpet the ground where it flourishes in cleared bush and where conditions are right. I have not found it north of Perth but a lot south and east of here. It turns up in some small, sandy pockets at the washouts of old streams that may cover a total area of 20-30 square meters. I really don't know how they get there especially when they rarely flower! I noticed that the tubers go down comparatively deep (about 15-20 cm) and are adequate in relation to the size of the plant. The tubers are scaled and deep red in color, never pale. As the plants dry out, they turn a unique golden orange only. This species is extremely constant.

26. *D. stolonifera*. There are about three main forms of this species. The forms vary in emergence habit and branching.

The upright form (Fig. 2). This form resembles *D. platypoda* but is much more robust and goes redder in color with leaf differences. This form likes to grow in sand as well as laterite soil and is not as common as the other forms. The flower is at its apex of growth late in the season after most of the stem has developed. It develops more red pigment than other forms since others are more orange.

The center flowering form (Fig. 3). This form is as common as the form below and the only difference is the pre-emergence of the flower spike in the center and usually there are no flowers on the stems bearing leaves.

The leaf-stem flowering form (Fig. 4). Here the flower usually terminates at the apex of the leaf growth which is present on many branches beginning at ground level.

The two forms above vary greatly in habit in different locations. They are inconsistent but still remain distinct from the upright form by the flowering habit and the non-creeping vegetative bud. The creeping bud can grow and break surface and then meander under fine or deep leaf mold for a few to 10 cm or more. Then the bud will rise a little and slowly swell over a period of time. Finally, it will grow in a burst and complete its growing cycle above ground. *D. stolonifera* always flowers best after brushfires although they are not absolutely imperative. One extreme form of *D. stolonifera* grows in Cannington swamps area. It has black pigmentation on all of the glands and vivid green elsewhere. Lacking red pigmentation for the most part, this form comes from very wet sandy peat and is an uncommon habitat for the species.

Usually, all the forms grow in well-drained soils of differing nature. Commonly, it is found in laterite soils of the hills area and in part shade in leaf mold. Although the most colorful plants rarely grow in very exposed areas, the tuber is always deep red, scaled and dished at the top with a very rounded base (Fig. 5) It is kidney-shaped in cross-section. Its range occurs over most of the state with the finest specimens found in the heavier rainfall areas (35-45 inches per annum).

27. *D. platypoda*. This species is very consistent within my limited experience with it. In a place where there was a previous brushfire, I have seen it flower only at the Stirling Range. The soil here was stony laterite mixed with white sand and a heavy concentration of humus. The soil appeared to be rather poorly drained. However, in an area east and west of Albany, the soils are mostly well-drained sandy loam or sandy clay. In these locations, the soils dry out in summer and are wet again by winter rains. The tuber is small in relation to the size of the plant (Fig. 6). It is usually or almost always oval-shaped with a



Fig. 6

point to the bottom. I have never seen *D. platypoda* or *D. stolonifera* growing together or even in close proximity. In the Stirling range, *D. platypoda* grows with a form of *D. platystigma* and around Albany, it grows with or near *D. pallida* (swamp form), *D. sulphurea*, and another unidentified climber.

28. *D. ramellosa*. I haven't seen this species yet.

30. *D. macrantha*. This beautiful species is extremely common. The leaves and stem contain no red pigments but develop a golden green color of pure brilliance. It turns slightly orange as it matures after flowering. The flowers are scented and are large. I found it growing in a variety of conditions and soils over the southwest. The sand growing specimens develop sooner and recede to larger tubers than the hills or heavier soil forms. It seems that the heavier soil forms not only emerge later but recede later. In both extremes of soil types, the species develops to its utmost. It does seem more prolific in sandy soils surrounding swampy areas. The tuber is white to pale cream in color and when bruised there is a reddish brown scab formed. On exposure to sun the tubers can take on a pinkish color. Usually the tuber is kidney shaped and has small warts all over the surface (Fig. 7). There are no scales. This species is very consistent throughout its range although very poor soils and harsh conditions do contribute to extreme growth variations. However, standard cultivation makes equal characteristics of all. I found that the soils are almost always well drained, fairly rich, and it prefers shade or the necessity of having a host to climb upon. In cultivation, this plant can grow to more than 6 inches in length but soon recedes at the end of flowering regardless of moisture and temperature.



Fig. 7

31. *D. subhirtella*. This species is another brilliantly yellow-flowered semi-climbing *Drosera*. It grows in poor soils of heavy texture with other CPs. It grows in the wheatbelt areas with rainfall 10-20 inches per annum. Later in the season, the plant does turn reddish as it matures. In one location, I have seen plants up to 80 cm tall under ideal conditions, but this is uncommon. At a location close to Perth, they grow in a layer of heavy soil over granite rocks with *D. bulbosa* and *D. erythrorhiza*. The tuber is smooth, round to kidney shape and bright yellow in color.

32. *D. strictacaulis*. A golden green plant with attractive flowers which is uncommonly found in its normal habitat because of destruction, or salt intrusion through land clearing as well as other pollutants. It prefers shady conditions with soils of a heavy texture and poorly drained, but drying in late spring-summer. The tuber is oval and small, red, scaled and usually not too deep. The growth habit is in the form of clusters of up to 3, 4, 5 plants with several seedlings surrounding it. It's quite a beautiful sight on a sunny, humid day.

33. *D. andersoniana*. Not seen as yet.

34. *D. menziesii*. This species is a variable erect or semi-erect sundew with three main forms and possibly two distinct species, but not enough information is known.

Swamp form. Sometimes called the heath form which commonly grows in nearly all swamps in the northwest that can be habitable to CPs. It grows from a few centimeters to about 20 centimeters. Its tuber is dark red, small and buried not too deep. The plant develops an intense maroon pigment to the extent that there is no green to be found on the plant at all. These *Droseras* appearing with thousands of large pink flowers swaying in a gentle breeze is something not easily forgotten. The swamp form grows in a variety of locations and soil types. Soils range from very poorly drained sands to pure peat or to mud or clay. Often, they form clumps of plants up to 20-30 in number. These tufts appear at a distance like dark red shrubs or small bushes. It grows with *D. pulchella*, *D. heterophylla*, *D. gigantea*, *D. neesi* and others.

Wheatbelt form. This form is unusual because of the definite blood red or crimson flower as compared with the pale to dark pink or even light mauve in the sand form. Under good conditions, this form grows a little larger than the swamp form but generally is much smaller in very exposed areas. Again, this form has the deep red-maroon pigmentation. I found it growing in association with *D. leucoblata*, *D. pyenoblata* and sometimes *D. zonaria*, and *D. pallida* in the low rainfall areas.

Sand form. This form is very large--up to 70-80 or even 100 cm high. It is erect but large plants are always in company of a leaning post. This form has



a pale mauve to pink flower and is larger than the other forms. The tuber is unusual, being pale pink in color, small and very deep. Most tubers are found so deep that it's almost unreasonable to dig them up since they go down about 30-50 cm in hard soils. Usually, they go down 25-30 cm but break off easily when the final move is made. The plants go redder as they mature, but usually most retain some green coloring. It grows always in well-drained areas and is found in association with *D. macrantha*, *D. pallida*, *D. paleacea*, *D. erythrorhiza* (sand), *D. zonaria*, *D. stolonifera* (sand form). At one location this form grows in abundance on the slopes of a stream and in association with *D. platystigma*, *D. miniata*, *D. erythrorhiza* and *D. bulbosa* "hills" form. The soil was laterite of a heavy texture with thick scrub and small trees. This may be an unclassified species but right now it's known as *D. menziesii*.

35. *D. microphylla*. This is an attractive, erect and uncommon sundew. Its leaf and stem have a combination of deep green and almost iridescent red. The flower is bizarre and easily noticed when in flower. I find that this plant is hard to find but usually grows in shady locations and in leaf mold around tall trees in laterite soils. It forms clumps up to six or more plants with seedlings nearby. The tuber is small and oval, deep red and scaled (Fig. 8). Erickson reports that this species grows in tussocks on granite rocks but as yet I have not seen it in this habitat. Plants are much larger further south in wetter areas.
36. *D. huegelii*. Only once have I seen this species (about five years ago) but I can't remember much.
37. *D. heterophylla*. This species is fairly common in wet areas that dry in summer. It is not fussy with soil just as long as it's wet in winter and spring. It often forms dense colonies and usually in association with *D. bulbosa* and *D. menziesii*. The tuber is white, smooth and round with a slightly top. Sometimes it is slightly scaled. It turns yellow-brown when bruised. The tuber is never found buried too deep and is usually covered with black remnants of previous growth. The flowers are white and many petalled, large and faintly perfumed. The leaves and stalk are semi-iridescent orange-green while the glands are black pigmented. It's a rather colorful plant with many contrasts that is easy to grow and often forms consistent dense clumps.
38. *D. pallida*. This species is a variable climbing sundew--a smooth mostly green plant. It is very rarely that this plant develops any dark pigmentation at all. An extreme form I once gathered at Badginarra, north of Perth, had tubers about 4-6 cm in diameter and grew extremely tall (2m). They grew with *D. drummondii* in very well-drained coarse quartz sand with about 10-20% laterite rock. They were on a slope of a laterite hill. Nowhere within one hundred miles did I see any more *D. pallida* to match these for their robust habit. These tubers developed mostly yellow and rarely pink pigment. Specimens from local haunts are varied in size but vegetatively consistent. It grows in most soils around here and down south but favors sandy conditions where it can climb on a host.
- The tuber is white or very pale cream, sometimes yellowish when exposed to the sun, or rarely pink (pale). It has warts similar to *D. macrantha* but not as pronounced. (More like pits than warts!!) The shape varies with the shape of the surrounding soil, but usually is round to kidney shaped. One form that grows down in the swamps with *Cephalotus follicularis* has small pink or reddish tubers and is almost smooth in texture. This form grows more than 8 feet in length and may be a new species. It is rather long lived above the ground.
40. *D. bulbigena*. I've seen this species only once growing near Waterloo in a swamp by the side of the road. The soil was sandy peat that dries out in summer. It was hard and very poorly drained. Unspoiled or intact plants are almost impossible to find since the plant is very small. I never saw the tubers.
41. *D. modesta*. I've seen this species only once, also in South Sterlings, growing in sandy soil in relation with supporting shrubs. This yellow-green plant is usually found in well-drained soil.
42. *D. sulphurea*. This uncommon species is limited in its range to constantly damp swamps with adequate exposure. It's associated with *Cephalotus* and other swamp *Drosera* and *Utricularia*. The flower is a very conspicuous brilliant yellow. The soil ranges from sandy peat to pure peat moss and the yellow colored tuber is slightly pitted sometimes. It seems to have a long life above the soil line in Spring and Summer, but it is late rising as other Southern swamp species are. The leaves and stem rarely develop darker pigment because it is nearly always sheltered somewhat. Finally, it grows fairly consistently throughout its range.



Fig. 8

43. *D. neesii*. This species is fairly common in varying habitats that are always dry by summer. It never develops any red pigment and appears always golden-green with a pink flower. The tuber is a smallish pink color and round to kidney shape and smooth. Being a very late riser, it is still around when other tuberous plants are going dormant even when the soil has dried somewhat. This species is also very consistent throughout its range.
44. *D. myriantha*. This uncommon species grows in mossy swamps around *Cephalotus* in soils ranging from sandy peat to living moss. It can continue to grow after flowering as can the other swamp growing climbing species and shows consistent characteristics throughout its range.
47. *D. gigantea*. This plant resembles asparagus shoots as it emerges from dormancy. It is late in rising from its deep cool hideaway in the soil. The shoots come up with folded scales with a smooth appearance and are either yellow-green or deep red in color. Pigmentation is very diverse varying from pale yellowish green to deep maroon. The whole plant is very striking especially when seen in colonies around the perimeters of some swamps. It is rather common and as long as there is slow moving water in winter and little competition for summer moisture, then you will probably find this species there. Its habitat usually dries out in summer but does so very slowly. The flowers are small, white and numerous. The whole plant usually keeps on growing until conditions become too inadequate and then it recedes to the deep tuber. Tubers of mature plants can be 3-4 cm in diameter with a deep red outershell but orange inside, scaled, kidney shaped and easily damaged.

It grows in association with many other CPs, although in some habitats this is the only species that can survive. This is especially so in salty creeks or heaths where other CPs have been wiped out years ago. Vagrant and introduced grasses and annual herbs which colonize wetlands do not seem to worry this species unduly but seedlings cannot survive--only the mature plants.

*D. species* (El Cabello Blanco). This new species is found from the Great Eastern Highway, near a horse stud farm called El Cabello Blanco. There is only one small location left near this place and soon it will be gone. Although this species resembles others in the *D. rosulata* group, much more work has to be done. It seems that the plant never develops red pigmentation but instead remains golden green with darker glandular pigmentation that's almost black in some plants. It grows in a heath of an even textured poorly drained loam. Nearby, *D. bulbosa* (hills form) and *D. menziesii* and several native terrestrial orchids grow here. *D. macrophylla* is closely related to this species.

This ends my list of tuberous *Drosera* of SW. - West Australia, but there are a few more species identified or unidentified as yet that I have not found or seen. So, in a future article I will describe them for you.

(Received May 6, 1977)

We owe a debt of gratitude to PHIL MANN for providing us with the information and plot of the various tuberous *Droseras* which grow in Western Australia. The numbers refer to the species described by STEVE ROSE and some of their locations. The enclosed numbers refer to major highway routes in the area.

